

a plurality of programmable summation kernels, each summation kernel programmable to selectively sum together a number of said pixels from said active pixel sensor; and

a resolution control circuit, producing an output signal which controls a size of said summation kernels between a minimum value kernel size and a maximum value kernel size by monitoring a received signal level from individual pixels, statistically determining numbers of pixels which are in specified states, and automatically changing the size of the summation kernels based on statistically determining.

9. (Amended) An adaptive programmable light imaging device, comprising:

an array of active pixel sensor pixels, each pixel producing a signal based only on the received radiation within the pixel;

a plurality of programmable summation kernels, each summation kernel programmable to selectively sum together a number of said pixels from said active pixel sensor; and

a resolution control circuit, producing an output signal which controls a size of said summation kernels between a minimum value kernel size and a maximum value kernel size by monitoring a received signal level from individual pixels,

statistically determining numbers of pixels which are in specified states, and automatically changing the size of the summation kernels based on statistically determining further comprising a counter which counts a number of pixels which are in specified illumination states and sets said summation kernel size based on said count.

15. (Amended) An adaptive programmable light imaging device, comprising:

an array of active pixel sensor pixels, each pixel producing a signal based only on the received radiation within the pixel;

a plurality of programmable summation kernels, each summation kernel programmable to selectively sum together a number of said pixels from said active pixel sensor; and a resolution control circuit, producing an output signal which controls a size of said summation kernels between a minimum value kernel size and a maximum value kernel size,

wherein said active pixel sensor includes a photoreceptor and a buffer transistor and a selection transistor, and

further comprising calibrating the circuit prior to detecting a desired resolution.

16. (Amended) An adaptive programmable light imaging device, comprising:

an array of active pixel sensor pixels, each pixel having an in-pixel buffer transistor, and in-pixel selection transistor, and a photoreceptor producing a signal based only on the received radiation within the pixel;

a double sampling circuit, operating to eliminate at least one amplifier offset from said signal;

a plurality of programmable summation kernels, each summation kernel programmable to selectively sum together a number of said pixels from said active pixel sensor; and

a resolution control circuit, including an illumination condition detecting part connected to said active pixel sensor pixels and determining the illumination condition therefrom, and producing an output signal which automatically controls a size of said summation kernels between a minimum value kernel size for a maximum illumination condition, and a maximum value kernel size based on a minimum illumination condition, wherein said illumination condition detecting part comprises a counter which counts numbers of pixels which are in specified illumination states and sets said summation kernel size based on said count.

18. (Amended) A device as in claim 16, wherein said counter detects whether at least half of the image has sufficiently bright pixels, and if so, configures the kernel size to be on.

19. (Amended) A device as in claim 16, wherein said counter determines if at least half of the number of pixels are dimmer than a specified value, and if so sets the kernel size to a preset maximum value.

Please add the following new claims.

21. An imaging device, comprising:  
an array of photosensor pixels, each pixel producing a signal based on light which is received within the pixel;  
a calibration element, associated with at least a plurality of said pixels, and operating to self-calibrate said pixels;  
a resolution control circuit, receiving individual pixel outputs after calibration by said calibration element, and determining an amount of light radiation being received by said individual pixel elements, and producing an output signal indicative thereof; and  
a plurality of programmable summation kernels, which are responsive to said output signal from said resolution control

circuit, and which are controlled by said output signal to selectively sum together a number of pixels from said array to form a composite pixel.

22. An imaging device as in claim 21, wherein said array of photosensor pixels is an array of active pixel sensor pixels.

23. An imaging device as in claim 21, wherein said resolution control circuit produces a signal that decreases kernel size when a specified number of pixels have illumination that is greater than a specified amount, and increases kernels size when a specified number of pixels have illumination that is less than the specified amount.

24. An imaging device as in claim 21, wherein said resolution control circuit statistically determines a percentage of said pixels which have light outputs greater than a specified amount.

25. An imaging device as in claim 24, wherein said resolution control circuit determines if half or more of said pixels have light outputs less than a specified threshold level, and indicating this as poor illumination, to set said

programmable summation kernels based on said poor illumination.

26. A method, comprising:

using a photosensitive array to acquire information indicative of an image in pixels of the photosensitive array;  
self-calibrating each of said pixels;

after said self-calibrating, first using said individual pixels to determine an amount of light being received by said pixels; and

second using said amount of light to set up kernel size for said pixels, between a minimum kernel size of one pixel, and a maximum kernel size larger than one pixel, where said larger kernel size is comprised of combination of multiple pixels, to obtain more illumination from the combined pixel.

27. A method as in claim 26, wherein said second using comprises determining statistically if more than a predetermined number of said pixels have illumination conditions of a specified type, and setting up said kernel size based on said determining.

28. A method as in claim 26, wherein said using a photosensitive array comprises acquiring information indicative

of image pixels within a photosensor pixel, and buffering said information indicative of said image pixels.

29. A method as in claim 28, wherein said second using comprises determining if more than half of the pixels have said specified illumination condition.

30. A method as in claim 26, wherein said second using comprises setting up kernel size for said pixel elements to maintain a desired signal to noise ratio in an output signal.

31. A method, comprising:  
using an array of photosensitive elements to acquire information indicative of an image;  
monitoring conditions of said image; and  
dynamically adjusting a spatial resolution of the output image to maintain a desired signal to noise ratio.

32. A method as in claim 31, said using a photosensitive array comprises acquiring information indicative of image pixels within a photosensor pixel, and buffering said information indicative of said image pixels.